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SOURCE Documentary as indicated. (Information specifically requested.)

RECENTLY PUBLISHED SOVIET RESEARCH ON ANTIBIOTICS

"An Experiment in Tuberculous Meningitis Treatment with Streptomycin," S. O. Dulitzky, R. M. Gotsman, H. K. Hartman and R. A. Friedman, 4 pp

"Byul Eksp Biol i Med," Vol 23, No 6, May 1947

Discussion, with results, of treatment by suboccipital injection of streptomycin, which was found to cause a change in the usual course of the disease, with an effect upon the meningeal symptoms. However, the cerebrospinal fluid remained pathological. (14TC)

"Discovery of Antibiotics and Tasks of General Microbiology," A. A. Imshenetsky, 9 pp

"Byul Eksp Biol i Med," Vol 23, No 5, May 1947 (8T69)

"Vitaminic and Enzymatic Properties of Mycelium of Penicillium," K. L. Povolotskay and F. V. Skorobogatova, 8 pp

"Biokhimika" Vol 12, No 3, Mar 1947

Study of the sterol content of the mycelium of penicillium, and a method for the isolation of ergosterol by direct extraction by dichloroethane after preliminary autolysis. (13T5)

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"Antibiotics and Bacterial Activity," G. F. Gauze, Sov. Med. Press., 1947
 "Uspekhi Sovremennoy Biologii," Vol 23, No 3, May 1947

Discusses optical inversion of the penicillin molecule, the streptomycin molecule and gramicidin S, the biological activity of optical isomers, and the restraining action of inverted molecules on enzymatic processes. (10150)

"Antibiotic Properties of Microorganisms," N. A. Brasili'nikov, 20 pp.

"Zhurnal Oshchety Biologii," Vol 8, No 1, Jan 1947

A study of the microbe-antagonists producing antibiotic substances (antibiotics) most widely distributed in nature and especially in the soil. (71106)

"Antibiotics," I. Ya. Postovskiy and N. P. Bednyagina

"Uspekhi Khim" Vol 16, 1947, pp 3-28

A critical review of recent work on penicillin, gramicidin, streptomycin, patulin, and allisin.

"Separation of Active Principle of Litmocidin and Investigation of Its Properties," M. G. Brashnikova, Inst Malaria Med Parasitology, Moscow

"Mikrobiologiya" Vol 15, 1946, pp 273-7

Method for obtaining litmocidin in a pure form is described in detail. This antibiotic substance belongs to the class of pigments and shows the same qualitative reactions as anthocyanidine. Litmocidin differs from the latter, however, in that the pigment group is not attached to the carbohydrate. Litmocidin has a constant melting point of 144-6° and can be obtained in two forms -- an acid form and an alkaline form. The two forms differ in their solubility in water.

"Litmocidin, A New Antibiotic Substance Produced by Proactinomyces cyanescens," G. F. Gauze, Inst of Tropical Med, Moscow, USSR

"Journal of Bacteriology" Vol 51, 1944, pp 649-53

A new variety of Proactinomyces cyanescens was isolated from a sample of south Russian soil and designated P. cyanescens-antibioticus. It produces an antibiotic substance of a new type, representing a derivative of anthocyanidine, and named "litmocidin." It reveals strong bacteriostatic action on staphylococci, streptococci, Vibrio comma, and tubercle bacilli. Its action is not inhibited by blood serum. Litmocidin was devoid of chemotherapeutic action in septicemic of mice caused by a strain of staphylococcus which was very susceptible to it in vitro.

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"Prolonged-action Drugs," M. Kh. Bergol'ts

"Farmatsiya", Vol. 9, No 2, 1946, pp 33-6

A critical review of efforts, in Russia and elsewhere, to prolong the action of drugs, such as penicillin, by use of forms or dosage techniques permitting slow transition into the blood stream.

"Erythrin, a New Antibiotic Substance of Animal Origin:
I. Preparation of Erythrin and Its Properties,"
L. A. Zil'ber and L. M. Yakobson

"Zhurnal Mikrobiol, Epidemiol i Immunobiol" No 12,
1946, pp 3-9

Extracts of naturally immune rat liver and spleen, frozen in liquid O, with NaCl solutions had a repressing action on diphtheria bacilli. Consistent results were obtained from preparations of the blood of a variety of animals and man, which was apparently due to a substance contained in the erythrocytes, and which was named erythrin. Method of isolating the substance is described. The best solution for experimental studies was 0.25 g of erythrin in 100 cc 3.8 per cent Na citrate, prepared by boiling for 2-3 minutes. The dry material can be stored for months at room temperature. Bacteriostatic levels are given for diphtheria, *Bacillus brevis*, staphylococcus, streptococcus, cholera, typhus, and intestinal bacteria. Experiments on pigs and monkeys are reported.

"Characteristic Antibacterial Properties of Gramicidin C," Z. G. Pershina

"Zhur Mikrobiol, Epidemiol i Immunobiol," No 3,
1946, pp 12-14

Gramicidin C exerts bactericidal action on all types of dysentery bacteria, on several strains of paratyphoid A and B coli. American preparations of tyrothricin, gramicidin, and tyrocidine did not show bactericidal effect on dysentery bacillus (Shiga). Gramicidin C is much more effective against staphylococcus than are the US preparations listed above.

"Action of Gramicidin C on Streptococcus Faecalis (Enterococcus faecogenes)," V. A. Krestovnikova
O. N. Taratorina

"Zhur Mikrobiol, Epidemiol i Immunobiol" No 3,
1946, pp 15-16

Gramicidin C is the only material at present which is effective against pathogenic enterococci. It is effective in doses of 6-50 micrograms (bacteriostatic).

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and 12-100 micrograms (bactericidal).

"Experimental Use of Gramicidin C for Clearing Smallpox Detritis of the Accompanying Microflora,"
G. F. Marchenko and N. Z. Rakham

"Zhur Mikrobiol, Epidemiol i Immunobiol," No 3, 1946, pp 16-18

Gramicidin C in concentrations of 800-1600 micrograms per cc for clearing of smallpox detritis of accompanying microflora gave almost clean preparations in 1-2 weeks. The virulence was noticeably reduced in time in both gramicidin-treated cases and in controls which were preserved only with glycerol.

"Bacteriemia and Toxicosis in Mechanism of Inhibition of Blood Carbonic Anhydrase -- Blood-Carbonic Anhydrase in the Evaluation of Penicillin Efficiency," E. Ya. Heiman

"Byull Ekspol Biol Med," Vol 22, No 7, 1946, pp 20-4

Toxins from *Bacillus perfringens* somewhat decreased carbonic anhydrase of the blood as compared to that of controls. Toxins from *B. cereus* decreased it decidedly. Determinations of carbonic anhydrase from blood mixed with physiological salt solution did not differ essentially from those made on blood mixed with equivalent amounts of hemolytic streptococcus or with hemolytic staphylococcus or with cultures of *Proteus vulgaris*. Diphtheria toxin decreased blood carbonic anhydrase decidedly also. Toxin from streptococcus toxin was inconsistent. Administration of penicillin in patients suffering from septic wounds was accompanied by an increase in carbonic anhydrase if the penicillin was administered in adequate amounts. An increase occurred at the same time as an improvement in the clinical picture of the patient. Doses of 40,000 to 160,000 units gave no increase. The author stresses the fact that large doses (400,000 to 3,700,000 units) given early had a favorable effect on wound healing and also increased carbonic anhydrase. It is concluded that measurements of carbonic anhydrase in the blood may be used as a laboratory check on the action of penicillin.

"Physico-chemical Nature of Antibiotic Action," V. A. Dorfman, E. A. M. Molodetskaya, T. L. Kastorskaya and P. S. Zasyplina, All-Union Inst of Exptl Med, Phys-Chem Lab, Moscow

"American Review of Soviet Medicine" Vol 3, 1946, pp 500-10

The zeta-potential (electric potential) of bacteria was measured by means of the microelectroporetic all-glass cell according to Northrop-Abramson. Migration rates are given in microns/second. The field strength varied in individual series of experiments from 5 to 7 v/cm. The bacteria were either suspended in broth

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or suspended in 0.5 per cent NaCl, or in M/15 phosphate buffer at different pH values. *Coli* phage and *staphylococcus* phage were used in addition to the previously studied lysozyme. All antibiotics studied, both bacteriolytic and bacteriostatic, caused an increase in the zeta-potential of the susceptible bacterial species within the first minute of interaction. The zeta-effect of the bacteriostatic agents did not change with time, while that of the bacteriolytic agents was reversible. These differences in time are tentatively attributed to the more profound structural and metabolic changes of the bacterial cell as caused by the lytic agents, while the primary rise in the zeta-potential was identical in both cases. The analysis of the correlation between penicillin concentration and its zeta-effect is also discussed.

"Isolation, Purification, and Properties of Litmocidin,"
M. G. Brashnikova, Inst of Tropical Med, Moscow

"Journal of Bacteriology" Vol 51, 1946, pp 655-7

A new antibiotic substance produced by *Proactinomyces cyanescens-antibioticus* was isolated and purified. It has a constant melting point; it is a pigment, and has much in common with the anthocyanin pigments of plants. Isolated in two forms, acid and alkaline, possessing different solubilities in water. Both forms inhibit the growth of *Staphylococcus aureus* in nutrient broth. Litmocidin is completely extracted from water by aqyl alcohol in acid reaction. Dry litmocidin is entirely stable; boiling of aqueous solution shows it to be stable at an acid reaction. Strong alkalies destroy the activity but not the color; heating with HCl removes the color but does not interfere with the antibiotic action.

"Conditions of Accumulation of Fat and Spore-formation in *Aspergillus Flavus*," V. O. Taison

"Investiya Akad Nauk SSSR, Seriya Biologicheskaya"
1945, pp 598-611

Under certain conditions the mold, *A. flavus*, is able to accumulate in its tissues considerable quantities of fat. Experiments were carried out to determine the effect of environmental conditions on carbohydrate synthesis and to establish the energy correlations involved with fat accumulation. Calculations based on the data obtained show that the coefficient of energy in the process of fat synthesis from the glucose amounts to 66.0-67.3 per cent, which is below the theoretical value, 85.13 per cent, but considerably above the value of the same coefficient reached by the mold during the process of building the mycelium as a whole. All data tend to show that both the intensification of the process of spore formation and accumulation of fat are the consequences of a disturbance in the normal utilization of N although the nature and character of this effect in both cases are widely different.

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"Light and Potassium in Development of Molds,"
V. E. Pontovich

"Izvestiya Akad Nauk SSSR, Seriya Biologicheskaya,"
1945, pp 612-21

Intensive formation of flavin pigment, inhibition of spore-formation, an increase in the percentage of protein N, and an increase in the total protein yield resulted from the action of light from argon tube and the incandescent lamp on cultures of *Aspergillus flavus*, in a medium with a normal K content. Increase in the heat of combustion and in energy efficiencies was also observed, which suggested accumulation in the fungus tissues of substances possessing high heats of combustion. In the unpigmented *Penicillium*, inhibition of growth takes place resulting in a decrease in weight and in the total protein N content. In the absence of light when the medium was deficient in K no flavin was formed and there was marked decrease in the total protein N content. Use of ammonia N in the K-deficient medium under dark incubation resulted in an abundant formation of melanins.

"Determination of Penicillin," N. M. Levitov, E. D. Vyshopan and A. M. Nanashova, Inst Biol Prophylaxis of Infections, Moscow

"Biokhimiya" Vol 10, 1945, pp 491-3

In the absence of an antibiotic, the bacterial cells in broth medium continue to multiply, and as a result there is an increase of respiration, as measured by a Warburg apparatus. When penicillin is present, the amount of O absorbed per unit time either remains constant or increases only slightly as compared to the control. Penicillin thus acts not on respiration but on the growth of the bacteria. Determination procedure is explained. The method is accurate to 0.01-0.02 Oxford units, and the results are available after 1.2-2 hours. No sterile materials are required. The method may be used not only for pure solutions of penicillin, but also for penicillin in blood and urine.

"Certain Biochemical Features Peculiar to the Fungus *Verticillium Dahliae* Klebsahn," A. A. Anisimova

"Compt Rend Acad Sci URSS," Vol 48, 1945, pp 416-19

The manner in which *V. dahliae* (I) utilizes the carbohydrate and N reserves of the American cotton plant was investigated. I was grown on a culture medium to which was added either galactose (II), glucose (III), fructose (IV), sucrose (VI), starch (VII), cellulose (VIII), peptone (VII), or edestin (IX). VI and all the sugars were well consumed with 90 per cent of III utilized in 15 days as compared to 60 per cent for II and IV. V, VI, and VII were all hydrolysed to monosaccharides before use by I. 36 per cent of VII was hydrolyzed in 52 days. VIII produces intense growth and 70 per cent increase in amino N in 7 days. IX is used more slowly.

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"Treatment of Purulent Pleurisy with Gramicidin,"
M. I. Lavrent'yeva, Voronezh Med Inst, Propaedeutic
Therapeutic Clinic.

"Gospital Delo" No 7-8, 1945, pp 14-15

"American Review of Soviet Medicine," No 4, 1947,
pp 397-9

Gramicidin has antibacterial properties toward cocci of a purulent type. (The Soviet gramicidin, as distinguished from the American type, consists wholly of the gramicidin group; it differs from American gramicidin in chemical composition as well as in its action on microbes.) Soviet gramicidin has a stronger effect on staphylococci than the American tyrothricin. It kills staphylococci at a concentration of 25 micrograms/cc, whereas the American preparation required a concentration four times as strong. The bactericidal action of Soviet gramicidin is 32 times that of chloracide, 16 times that of chloramine, and 4 times that of rivanol. After 2 or 3 aspirations of pus from the pleural cavity and the introduction of gramicidin, the general condition of the patient radically improved and pus usually disappeared. X-rays verified the absence of pleural effusion and the presence of pleural adhesions. Blood counts showed a decrease in the quantity of leucocytes. Gramicidin was more effective in the case of empyemas resulting from pneumonia and good when fed as iodized salt than when larger amounts were given by syringe.

"Chemical Nature of Gramicidin S," A. N. Eclozetskiy and T. S. Pashkina, Acad Med Sci, Moscow

"Biotekhnika" Vol 10, 1945, pp 344-52

Gramicidin S (S-Soviet) differs from the gramicidin of Cubos, as indicated by the following constants: m.p. 245-70; molecular weight (Rast), 1,060-1,340; (6)₀ - 276.0; total N, 13.35 per cent; amino N (Wilstuetter), 0.90 per cent; amino N (Van Slyke, 15 min.), 1.47 per cent; amino N (Van Slyke, 30 min), 1.81 per cent; ornithine, 23.68 per cent; proline, 10.15 per cent; phenylalanine, 7.5 per cent; leucine, 40-45 per cent; valine 10-15 per cent. Some of the leucine and valine may be present in the d-form. The presence of free amino and carboxyl groups in gramicidin S makes it improbable that a cyclopeptide structure exists.

"Antibacterial Peculiarities of Aspergillus Niger," N. A. Krasil'nikov and A. I. Korenyako

"Mikrobiologiya" Vol 14, 1945, pp 347-52

Aspergillin was extracted by alcohol and was found to be thermostable. It is active against grampositive and gramnegative bacteria, slightly active against spore-bearing actinomycetes and inactive against yeast fungi. Its activity on wounds is not diminished by pus or serum or in situ. Its action is similar to that of penicillin but is more stable and active.

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against gram-negative bacteria. Aspergillin, or the extract, seems to contain also riboflavin, pyridoxine, inositol, and folic acid-like activities.

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